REMARKS

Applicants have carefully considered the December 1, 2004 Office Action regarding the above-identified application, and the amendments above together with the remarks that follow are presented in a bona fide effort to respond thereto and address all issues raised in that Action. Independent claim 15 has been cancelled. A new dependent method claim (17) has been added. Independent claims 1, 2, and 16 are amended to more clearly distinguish over applied art, as discussed more below. Claims 3 and 4 have been amended to conform to the amended versions of parent claims 1 and 2. Prompt favorable reconsideration of this amended application is requested.

The Examiner objected to claims 2 and 12 and made suggestions for correction. Both suggestions have been adopted. In the fourth paragraph of claim 2, "one switch optical" has been changed to "one optical switch." Also, a comma and the word "and" have been added at the end of the seventh paragraph of claim 12. These changes should obviate the objections, albeit without narrowing claim scope. Also, non-substantive/non-limiting amendments have been made to the "switch" and "control circuit" paragraphs of claim 1 and to the "switch" paragraph of claim 12.

In the second Action, claims 1-9, 12, 15 and 16 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Publication No. 2004/0151499 to Ibukuro et al. (hereinafter Ibukuro). This rejection is traversed with regard to the pending claim set.

As disclosed in the present application, switching equipment 100 (Fig. 2) or 100' (Fig. 3) forms an add/drop multiplexer or a cross-connect. The switching equipment includes first interfaces for transmitting or receiving optical signals from other similar switching equipment. In Figs. 2 and 3, fibers 200 include both incoming fibers (200-I1 to 200-IN) carrying optical signals for receipt by the particular switching equipment and fibers (200-O1 to 200-ON) carrying

optical signals from the particular switching equipment to other similar switching equipment. The switching equipment also interfaces to fibers 300-I1 to 300-IN carrying optical signals from terminal equipment and fibers 300-O1 to 300-ON carrying optical signals from the particular switching equipment to the terminal equipment. The "optical switching equipment" includes at least one optical switch.

Consider an example of communicating a signal around the ring from one terminal to another. On the originating side, a distributor bridge 180 splits an optical signal received from a terminal into two duplicate copies thereof, for duplex transmission, that is to say for transmission in opposite directions or routes R0 and R1 through the rings of the network 10 (Fig. 1). In the originating node, the switch or switches couple the split signals to appropriate first interfaces, for addition to the signals being transmitted over the fibers to other switching equipment. Intermediate switching equipment passes optical signals between first interfaces, to enable transport of the optical signals through to other equipment and thus around the rings in opposite directions.

At a network node providing a link to the destination (e.g. at 100-10), switching equipment receives the duplex transmitted copies of the signal via two of the fibers 200 from other switching equipment (two incoming 'first routes'). In this switching equipment, routes are set through one or more optical switches, to enable transport of the received duplex copies of the signal to a selector 185 associated with a fiber 300 (another 'second route') going to the destination. The selector 185 selects one of the duplexed optical signals, typically the better signal, and then outputs the selected signal to associated fiber 300 for transport to the destination, e.g. to the terminal B or the like. Attention is directed to the description in the paragraph (3) starting in line 19 of page 11 of the specification (see also line 21 of page 15 to line 5 of page

16). Of course, in a network providing full two-way communications to end users (e.g. A or B), any node will be both an ingress node and an egress node; and any such node will include elements for splitting signals received from second routes and selecting one signal (from two or more) for output to each of the second routes. The equipment at each such node also will pass some optical signals through (in transit) between trunk fibers to/from other nodes.

As shown by the above discussion, the disclosed equipment provides three different types of internal switch routes for optical signals. First, the switch or switches, e.g. in OADM 100-1, route the split copies of the optical signals from the terminal A to the interfaces for addition to the signals being transmitted via the optical fibers 200. These would be the 'Add' routes in Figs. 2 and 3. For incoming signals intended for a terminal, the switch or switches in OADM 100-1 route two signals received from fibers 200 to the selector for the particular terminal. These would be the 'Drop' routes in Figs. 2 and 3. However, the switching equipment also passes signals around the rings, hence, the switch or switches in OADM 100-1 also provide routes between the interfaces to the fibers 200, for those optical signals that simply transit the switching equipment, as represented by the 'Pass' routes shown in Figs. 2 and 3.

The routing and transmission on two different paths and/or the reception and routing from two different paths enables communication around a ring over redundant optical paths (R0, R1). This redundant communication improves the reliability of the optical transmission network. When the signal is input (added) to the optical transmission network, the signal is split into plural signals by the bridge (180). The split signals go through the different routes (Add) in the optical switch (140) to be output to different physical lines (optical transmission paths). The same signals go through the different paths in the optical transmission networks. When the signal is output (dropped), the signals from the different physical lines input through the different routes

(Drop) in the optical switch and are gathered at the selector (185) to select one (with the best quality) of the signals and output it. The optical switch should be controlled to establish the **different routes** for the same signals split by the bridge. The **different routes** through the internal switch or switches enable the redundant paths around the ring in the transmission system. In this way, the same signals go through different paths; and if any fault occurs on a physical line or equipment on one path, the signal on the other path is still available.

Each of the independent claims specifies one or more aspects of these routes that are not disclosed by Ibukuro. Consider claim 1 as a first example.

Independent claim 1 has been amended to specify aspects of the setting of routes. Specifically, claim 1 recites that the control circuit sets a route between the first interfaces in the optical switch. These routes correspond to the disclosed 'Pass' routes. In addition claim 1 recites that the control circuit sets in the optical switch, either for (a) routes outputting the split optical signals split **to different** first optical transmission routes, or (b) routes leading optical signals **from different** first optical transmission routes, having been split from an optical signal at a second interface of the other optical switching equipment, to the selecting and outputting means in the second interface in the optical switching equipment. The routes (a) correspond to the exemplary disclosed redundant 'Add' routes, whereas the routes (b) correspond to the exemplary disclosed redundant 'Drop' routes.

The rejection of claim 1 relied on Figs. 5, 6 and 16 of Ibukuro to purportedly meet various elements of the previous version of claim 1. Figs. 5 and 6, however, represent somewhat different embodiments of Ibukuro's teachings. For example, in the embodiment of Fig. 5, each terminal device itself includes two different systems (0) and (1) for supplying signals to the two switches. In the embodiment of Fig. 6, each of those two signals is split further in two, as shown

only by branches in the drawing. Fig. 16 shows a configuration with a monitor on the drop side (see e.g. column 3, lines 7-8).

Ibukuro shows an optical node system (see e.g. Fig. 5) in which each node has two optical switches (OSW) having the same structure. The signal from the transponder W1 is split by the distributor 17-1 and the split signals are input to OSW (0) and OSW (1), respectively. The signals from OSW (0) and OSW (1) are output to the selector 18-3; and either one of the two signals is output to the transponder W2. The signals split by the distributor go to the same output port of the optical network protection equipment (ONPE). In this way, Ibukuro duplicates the optical switch within one optical node. This provides internal switch redundancy. When one optical switch OSW fails, the other optical switch OSW can operate so that the optical node works properly.

As noted in the embodiment of Fig. 5, the two signals are supplied by two different terminal systems (0) and (1). In such an embodiment, there is no splitting at the switching equipment. Although not shown in relation to that embodiment, presumably there would be no selection or combining of split signals before delivery to the separate systems of the terminal at the remote destination.

Further, in Fig. 5 of Ibukuro, the ports connected to the transponders correspond to the first interfaces of claim 1. The signal from Ibukuro's transponder is split (distributed at DIS) into two signals, and one of the two signals is selected (at SEL) to output to another transponder. This is different from the equipment of claim 1. In claim 1, a signal from the first interface is either routed through to another first interface, or a signal from one of two different first interfaces is routed to a selector. The split or selection operation in claim 1 is performed on the signal from of the signals going to the second interface, e.g. in the 'Add' or 'Drop' function.

In the embodiment of Fig. 6, there is splitting, and the split signals are supplied to two different switches. From the discussion of this embodiment (starting in line 1 of column 10), however, it appears that the split signals are selected as mutually exclusive alternatives. Either the one set of signals from the terminal systems (0) and (1) are routed through, or if there is a fault, the second set of signals from the terminal systems (0) and (1) are routed through. It is not seen where the Ibukuro patent teaches setting routes for supplying both split versions of either signal to two trunk interfaces over different routes at the same time.

In Ibukuro (see Fig. 6), the client terminal TE 21 transmits the signal via both of the work system 0 and the protection system 1. Each signal input to the system is split into two signals, which go through different switches. The signals output from different switches are input to selector 27 to select one of signals. The signal from client TE 21 corresponds to the added signal. The signal is redundant inside the switch only. The signal is not redundant in the transmission path after selector 27. In Fig. 5, the client terminal TE 21 uses both the system 0 and the system 1. Hence, the respective signals may go on the different transmission paths after selectors 27 and 28. However, this redundant routing is due to the redundant client structure, i.e. the redundant initial transmission by the client terminal from system (0) and system (1), not the splitting within the switching equipment or other node function as would satisfy the requirements for splitting and routing split signals that are specified in independent claim 1.

In the 'drop' side embodiment of Fig. 16, signals from two trunk circuit transponders 40, 41 are split and supplied to two switches. For a given client terminal 45 (having two systems (0) and (1)), each signal from one of the switches is split again. Selectors 43, 44 allow selection of a split signal from each switch, for output to either of the two terminal systems. However, the (0) and (1) signals apparently are locally split, between the transponders and the two switches. The

selection apparently only allows routing around a failed local switch. It is not seen where this teaches routing of signals from two trunk fibers through the local switch, for selection of one version of those two signals for output to a link going to a terminal system.

As such, it is believed that Ibukuro does not teach an embodiment of one set of optical switching equipment that both provides a route between first interfaces, that is to say for pass through from a fiber from another node to another fiber going to another node, <u>and</u> provides routes for different split signals, either locally split for transmission over two fibers to other equipment or split at another node and being delivered to a selector for selective output to connected communication equipment.

The intent of Ibukuro is to provide redundancy to overcome a malfunction of a switch in the optical node by providing redundant optical switches. The equipment of claim 1 overcomes a failure of the network, including a physical line and any intermediate equipment, by providing redundant transmission paths for the split signals.

For these reasons, it is respectfully submitted that Ibukuro does not actually disclose an embodiment of optical switching equipment that meets the requirements now specified in claim 1, particularly those relating to the splitting or selecting and to the attendant routes set through the optical switch. Hence, claim 1 and the claims that depend therefrom distinguish over Ibukuro, and the rejection of those claims should be withdrawn.

Claim 2 has been amended to specify that the control sets a route through the at least one optical switch, for leading an optical signal from one of the optical receivers to one of the optical transmitters. This route corresponds to the 'Pass' route in the examples in Applicants' drawings. Claim 2 also now recites that the control circuit sets either routes for outputting signals split by a distributor to two different transmitters (e.g. in an 'Add' function) or routes supplying signals

from two different receivers (having been split at another equipment) to one of the selectors within this optical switching equipment. Similarly, claim 16 now recites setting a route between adjusters connected to/from first optical transmission routes (via other elements), and the claim recites setting different routes either for split signals going to second optical adjusters connected to two first optical transmission routes or from different first optical transmission routes going to a selector. As discussed above, Ibukuro does not teach an embodiment of one set of optical switching equipment that both provides a pass route from a fiber from another node to another fiber going to another node and provides routes for different split signals, either locally split for transmission over two fibers to other equipment or split at another node and being delivered to a selector for selective output to connected communication equipment. Hence, Ibukuro does not disclose any equipment that actually meets all of the limitations of amended claim 2 or all of the limitations of amended claim 16. Hence, these independent claims and the claims that depend from 2 distinguish over Ibukuro, and the rejection of those claims should be withdrawn.

Claim 9 is an independent method claim, and new claim 17 depends from 9. The method of claim 9 entails switching routes of at least two optical signals received from different first optical transmission routes that are destined for one of the fourth optical transmission routes, and selecting one of those received optical signals for output to the one fourth optical transmission route. These steps correspond to the disclosed routing of redundant signals from the R0, R1 paths through the switch or switches to a selector 185 and selecting one of those signals for output, for the 'Drop' function disclosed in Applicants' specification. Claim 9 also includes steps relating to splitting an optical signal received from one of the second optical transmission routes, switching the routes of the split optical signals for different third optical transmission routes, and outputting the routed split optical signals to different third optical transmission

routes. These steps correspond to the disclosed routing of redundant signals from an interface for one local communication device through the switching equipment to the R0, R1 paths, for the 'Add' function disclosed in Applicants' specification.

As discussed above, it is believed that no embodiment disclosed in Ibukuro provides the splitting and routing for signals outbound from one optical route to provide those split signals to two different routes to other equipment <u>and</u> routing optical signals received from two routes from other equipment to a selector. Hence, operation in a manner disclosed by Ibukuro would not meet all of the method step requirements of claim 9. Claims 9 and 17 therefore should be allowable over Ibukuro.

Claim 12 is a network claim. Claim 12, however, recites functions of each switching equipment related to the 'Add' (adding), 'Drop' (dropping) and 'Pass' (relaying) functions discussed above. For in the 'Add' case, a received optical signal is split at one of the second interfaces, and the respective split optical signals are transmitted to different optical switching equipments via the different routes through at least one optical switch and different first optical transmission routes respectively. For the 'Drop' case, different routes in the optical switch are set for optical signals received from different optical switching equipments via different first optical transmission routes. These switch routes go to one second interface, which selects one optical signal for output. For the 'Pass' case, an optical signal received from one of the first transmission routes is output to a destination first optical transmission route through a route set in the optical switch. As discussed above, it is believe that no embodiment disclosed in Ibukuro actually provides all three of these different types of routing through the switching equipment. Hence, the network disclosed in Ibukuro would not meet all of the requirements of claim 12, and that claim should be allowable over Ibukuro.

For the reasons outlined above, all of the pending claims (1-9, 12, 16 and 17) should now be in condition for allowance. Applicants respectfully request a prompt favorable reconsideration of this matter.

It is believed that this response addresses all issues raised in the December 1, 2004 Office Action. However, if any further issue should arise that may be addressed in an interview or an Examiner's amendment, it is requested that the Examiner telephone Applicants' representative at the number shown below.

To the extent necessary, if any, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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